Amendments to the Specification are as follows:

Please amend the section entitled "Background of the Invention" as follows:

(Amended) BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an active matrix display device suitably used as a reflective display device using external light reflection for a display.

2. Description of the Related Art

In the field of display devices, an active matrix display device capable of obtaining a high-quality display is widely used. In this display device, a switching element is provided for each of a plurality of pixel electrodes to perform secure switching, thereby easily achieving characteristics such as a large size, high precision, etc.

Recently, it has been strongly demanded to decrease power consumption, and to widen a pixel region as ~~must~~much as possible for improving display brightness. Therefore, a display device comprising a thick insulating film formed over the entire surface of an active matrix substrate, and reflective pixel electrodes formed on the insulating film has been put into practical use. In this structure comprising the pixel electrodes formed on the insulating film, an electrical short circuit does not occur between the pixel electrodes disposed on the insulating film and scanning lines and signal lines disposed below the insulating film. Thus, the pixel electrodes can be formed over a wide area so as to overlap with these wirings, and thus a pixel region contributing to a display can be formed over all regions other than regions for switching elements such as thin film transistors (abbreviated to "TFT" hereinafter), and the scanning lines and signal lines, thereby achieving a bright display due to an increased aperture ratio.

In the above-described structure in which the pixel electrodes are formed on the insulating film, contact between a source electrode and a reflective electrode of each of the TFTs is achieved through a contact hole passing through the insulating film in the thickness direction thereof. The contact hole is disposed in each of the pixel pitches, and thus a slight

deviation occurs between a plurality of contact hole patterns in repeated patterning. However, in a reflective display device, light is scattered by recesses of the reflective electrodes formed along the shapes of the contact holes, and thus moir~~e occurs~~é fringes occur due to the light scattering~~ to possibly~~, which decrease visibility.

A reflective liquid crystal display device comprising a reflective electrode having an uneven surface which serves as a diffuse reflective surface is conventionally put into practical use. However, in the use of the reflective electrode having the diffuse reflective surface, ~~a moire display is~~moiré fringes are likely to be enhanced by the influence of the recesses of the reflective electrode formed along the shapes of the contact holes.

Please amend the section entitled "Summary of the Invention" as follows:

(Amended) SUMMARY OF THE INVENTION

The present invention has been achieved in consideration of the above problem, and an object of the present invention is to provide an active matrix display device capable of preventing the occurrence of moireé fringes due to contact holes.

In order to achieve the object, an active matrix display device of the present invention comprises an active matrix substrate which comprises a plurality of scanning lines, a plurality of signal lines intersecting the scanning lines, switching elements provided near the respective intersections of the scanning lines and the signal lines, an insulating layer having contact holes connected to the switching elements and covering the scanning lines, the signal lines and the switching elements, and pixel electrodes electrically connected to the switching elements through the contact holes formed in the insulating layer; a counter substrate having a counter electrode facing the pixel electrodes; and a light modulating layer held between the active matrix substrate and the counter substrate; wherein the contact holes are masked in a plan view.

In this construction, since the contact holes are masked in a plan view, the occurrence of moireé fringes due to the arrangement of the contact holes can be prevented.

Particularly, in a reflective display device comprising diffusively reflective electrodes used as pixel electrodes, visibility possibly significantly deteriorates due to the moir~~e~~é fringes which ~~is~~are caused by ~~great~~a large amount of scattering in the contact holes. However, as described above, a high-quality display without moir~~e~~é fringes can be obtained by shielding from light reflected by the contact holes. For example, the diffusively reflective electrodes are formed in light diffusion recesses formed in the insulating layer so that each ~~of the~~ electrode serves as ~~the~~a pixel electrode having a shape conforming to each recess.

In a plan view, the contact holes may be masked with a shielding layer formed on one of the active matrix substrate and the counter substrate. Specifically, a color filter layer is formed on one of the active matrix substrate and the counter substrate, and the color filter layer preferably comprises a plurality of color filters disposed corresponding to the respective pixel electrodes, and the shielding layer being preferably disposed between the adjacent color filters. In this case, a color display can be realized.

Also, a plurality of the contact holes is preferably arranged in the length direction of the scanning lines or signal lines. In this construction, contact resistance between the pixel electrodes and the switching elements can be decreased by the plurality of contact holes. Even when a contact defect occurs between the pixel electrode and switching element in one of the contact holes, conduction can be attained through the other contact holes, thereby improving production yield. Furthermore, since the contact holes are arranged in the length direction of the scanning lines or the signal lines, for example, when the contact holes are masked in a plan view with the shielding layer provided along the scanning lines or the signal lines, the area of the pixel electrodes masked with the light shielding layer is smaller than that in a case in which the contact holes are arranged in a direction perpendicular to the scanning lines or signal lines, thereby increasing the aperture ratio.

Each of the switching elements may be formed as a thin film transistor comprising a gate electrode extending from the corresponding scanning line, a gate insulating layer disposed on the gate electrode, a source electrode disposed on the gate insulating layer to extend from the corresponding signal line, and a drain electrode electrically connected to the pixel electrode through

the contact holes formed in the gate insulating layer. In this case, the drain electrode preferably has an extension extending from a portion positioned above the gate electrode to the scanning line side or the signal line side so that the contact holes are connected to the extension.

In this construction, since the contact holes are formed to be connected to the extension extending to the scanning line side or the signal line side, for example, when the contact holes are masked in a plan view with the shielding layer provided along the scanning lines or signal lines, the area of the pixel electrodes masked with the shielding layer is small, thereby increasing the aperture ratio. In this case, only the extensions are disposed near the scanning lines or signal lines, and thus electrical characteristics ~~less~~ deteriorate less due to ~~capacity~~capacitance coupling between the drain electrodes and the scanning lines or signal lines.

Please amend the paragraph beginning on page 8, line 19 and ending on page 9, line 3 as follows:

(Amended) As shown in Fig. 1, the active matrix substrate 110 comprises pluralities of scanning lines 126 and signal lines 125 which are formed on a substrate body 111 made of glass, plastic or the like in the row direction (x-axis direction) and column direction (y-axis direction), respectively, so as to be electrically insulated from each other, a TFT (switching element) 130 being formed near each of the intersections of the scanning lines 126 and the signal lines 125. On the substrate 110, a region for forming the pixel electrodes 120, a region for forming the TFTs 130, and a region for forming the scanning lines 126 and the signal lines 125 are referred to as a "pixel region", a "element region", and a "wiring region", respectively.

Please amend the paragraph beginning on page 11, line 18 and ending on page 12, line 3 as follows:

(Amended) An insulating layer has a two-layer structure comprising the inorganic insulating layer 118 comprising a silicon-based insulating film of silicon nitride (SiN_y) or the like, and the organic insulating layer 119 comprising an acrylic resin, a polyimide resin, a benzocyclobutene polymer (BCB) or the like, for enhancing the function to protect the TFTs 130. The

organic insulating layer 119 is relatively thickly laminated on the substrate 111 to ensure insulation between the pixel electrodes and the TFTs 130 and the wirings 126 and 125, thereby preventing the occurrence of ~~capacity~~capacitance coupling between the pixel electrodes 120 and the TFTs 130. Also, a stepped structure formed on the substrate 111 by the TFTs 130 and the wirings 126 and 125 is planarized by the thick organic insulating layer 119.

Please amend the paragraph on page 13, lines 5-14 as follows:

(Amended) Each of the recesses 120g has a spherical inner surface so that light incident on each of the pixel electrodes 120 at a predetermined angle (for example, 30°) is diffusively reflected with a substantially symmetrical brightness distribution with a regular reflection angle as a center. Specifically, the inclination angle of the inner surface of each recess 120g is set in the range of -18° to +18°. Also, the pitch of the adjacent recesses 120g is randomly set for preventing the occurrence of moir~~e~~é fringes due to the arrangement of the recesses 120g.

Please amend the paragraph on page 13, lines 15-23 as follows:

(Amended) The diameter of each recess 120g is set to 5 μm to 100 μm from the viewpoint of ease of manufacture, and the depth of each recess 120g is set in the range of 0.1 μm to 3 μm. This is because with the recesses 120g having a depth of less than 0.1 μm, the effect of diffusing reflected light cannot be obtained, while with a depth of over 3 μm, the pitch of the recesses 120g must be increased for satisfying the condition of the inclination angles of the inner surfaces, thereby possibly causing moir~~e~~é fringes.

Please amend the paragraph on page 18, lines 13-27 as follows:

(Amended) Furthermore, as shown in Fig. 8, the extension direction of the grooves 221 is inclined at a predetermined angle α with respect to the arrangement direction (x-axis direction) of the pixels 120A of the liquid crystal panel 100 so as to prevent the occurrence of moir~~e~~é fringes due to interference between the grooves 221 and the pixels 120A. The inclination angle α is set in the range of 0° to 15°, and preferably in the range of 6.5° to

8.5°. Also, the pitch P_1 of the grooves 221 is smaller than the pixel pitch P_0 so that illumination irregularity with a period corresponding to the pitch P_1 of the grooves 221 is leveled within the pixels 120A, thereby preventing the irregularity from being observed by an observer. Particularly, the pitch P_1 of the grooves 221 and the pixel pitch P_0 preferably satisfy the relationship $0.5P_0 < P_1 < 0.75P_0$.

Please amend the paragraph on page 19, lines 5-16 as follows:

(Amended) Therefore, in the reflective liquid crystal display device of this embodiment, in a plan view, the contact holes 121 and 122 are masked with the shielding layer 142S, and thus the occurrence of moireé fringes due to the arrangement of the contact holes 121 and 122 can be prevented. Particularly, in a reflective display device using the diffusively reflective electrodes 120, light is greatly scattered by the recesses 120g of the pixel electrodes 120 formed near the contact holes 121 and 122 to cause the probability that strong moireé fringes is observed. However, such scattered light can be cut off by the shielding layer 142S to obtain a high-quality display without remarked moireé fringes.

Please amend the paragraph on page 19, lines 17-25 as follows:

(Amended) Also, the contact holes 121 and 122 are formed in the extensions 117a disposed near the scanning lines 126, and thus the area of the pixel electrodes 120 masked with the shielding layer 142S can be decreased. Consequently, the aperture ratio can be increased to achieve a bright display. In this case, only the extensions 117a are disposed near the scanning lines 126, and thus electrical characteristics ~~less~~ deteriorate less due to ~~capacity~~capacitance coupling between the drain electrodes 117 and the scanning lines 126.

Please amend the paragraph on page 20, lines 5-7 as follows:

(Amended) Like in the above embodiment, even in this modified embodiment, therefore, a high-quality display without ~~remarked moire~~moiré fringes can be achieved.

Please amend the paragraph on page 27, lines 9-18 as follows:

(Amended) As described in detail above, according to the present invention, contact holes are masked in a plan view, and thus the occurrence of moireé fringes due to the arrangement of the contact holes can be prevented. Particularly, in a reflective display device comprising as diffusively reflective electrodes as pixel electrodes, visibility is possibly significantly deteriorated by moireé fringes due to ~~great~~large amount of scattering in the contact holes. However, as described above, light reflected from the contact holes is cut off to obtain a high-quality display without moireé fringes.